

# **WATER DAMAGE/MOLD INVESTIGATION**

**Department of Children and Families  
143 Munson Street  
Greenfield, MA**



Prepared by:  
Massachusetts Department of Public Health  
Bureau of Environmental Health  
Indoor Air Quality Program  
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## BACKGROUND

<b>Building:</b>	Department of Children and Families (DCF)
<b>Address:</b>	143 Munson Street Greenfield, MA
<b>Assessment Requested by:</b>	Erin R. McCabe EHS Facilities Deputy Director for Finance and Operations Executive Office of Health and Human Services
<b>Reason for Request:</b>	Mold/water damage concerns
<b>Date of Assessment:</b>	November 16, 2018
<b>Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:</b>	Michael Feeney, Director, Indoor Air Quality (IAQ) Program
<b>Building Description:</b>	Brick building with a flat roof.
<b>Windows:</b>	Windows are not openable.

## IAQ Testing Results

Please refer to the IAQ Manual for methods, sampling procedures, and interpretation of results (MDPH, 2015). The following is a summary of testing results.

- ***Temperature*** was within or close to the lower end of the recommended range of 70°F to 78°F in the areas tested.
- ***Relative humidity*** was within the recommended range of 40 to 60% in most areas tested at the time of the assessment and all but one measurement was lower than outside/background.
- ***Moisture Measurements*** in base of restroom wall showed elevated levels of moisture at the time of assessment.

## Background and Discussion

Note that the BEH/IAQ program made a previous visit to this facility to perform a full assessment of the ventilation and other conditions present. The report from that visit is available on the DPH IAQ website at: <https://www.mass.gov/info-details/indoor-air-quality-reports-cities-and-towns-g#greenfield->

The BEH/IAQ Program was asked to examine the DCF building due to water damage from a combination of a water heater failure and high relative humidity during the hot, humid weather during the summer months of 2018. A water heater located above the wall cavity of the employee restroom (Picture 1) catastrophically failed in August 2018. Over time, a musty odor developed in the employee restroom. Upon entering the employee restroom, IAQ staff detected a distinct musty odor, but could not readily identify the source of the odor.

### **Microbial/Moisture Concerns**

IAQ staff examined the employee restroom. IAQ staff used a number of methods to assess whether the floor drain or a failed wax ring of the pedestal toilet were the source of this odor. Sealing the floor drain with wet paper to form an airtight seal did not eliminate the musty odor. Fragrant oil (vanilla) was used to ascertain whether the toilet wax ring had failed which would result in sewer odor entering the employee restroom. The vanilla oil was flushed into the sewer pipe from an adjacent restroom toilet. No odor of vanilla could be detected in the employee restroom, indicating the wax ring was intact and therefore air tight. Based on these observations, the plumbing was eliminated as the source of the odor.

Walls in the restroom were assessed using a moisture meter. The interior tiled wall of the restroom was found moistened near the floor. Gypsum wallboard (GW) beneath the plastic coving in the hallway opposite the tiled wall was found moistened. As a comparison, walls outside the employee restroom were assessed and were found to have non-detectable moisture levels. Moisture samples taken in public restrooms in locations similar to the employee restroom also had non-detectable moisture levels. Based on this observation, there appears to be moisture inside the wall cavity. The most likely source of this moisture is water that pooled at the bottom of the wall cavity as a result of the water heater failure.

There are several factors that indicate that the water-damaged GW is the source of the musty odors:

- Both the tile and plastic coving are water-impermeable materials that would prevent GW from drying.
- In order to increase the ability for GW wall cavities to dry, it is recommended to remove plastic coving and drill holes into the base of the wall to allow for moisture to escape.

Building staff did not indicate that this process was used.

- In general, the US Environmental Protection Agency (US EPA) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommends that porous materials (e.g., GW, carpeting) be dried with fans and heating within 24 to 48 hours of becoming wet (US EPA, 2008; ACGIH, 1989). If porous materials are not dried within this time frame, mold growth may occur.
- The employee restroom exhaust vent was found to be supplying air rather than exhausting it. The adjacent public restrooms were drawing air, which would remove water vapor from these locations. In its condition, the employee restroom had no mechanical means to remove water vapor, which would aid drying of the GW.
- New England experienced an unprecedented period of extended hot, humid weather. According to the Washington Post, “[d]ata...show[s]...cities in the Northeast have witnessed such humidity levels for record-challenging duration...[i]ncluding Albany, Boston, Burlington Portland and Providence” during the summer of 2018 (WP, 2018). “Boston and nearby locations... [saw]...historic numbers of those warm nights with low temperatures at or above 70 degrees...Providence and Blue Hill Observatory have already broken their annual records” (WP, 2018). If a building does not have adequate exhaust ventilation and air chilling capacity to remove/reduce relative humidity from outside air, then hot, moist air can be introduced into a building and linger to increase occupant discomfort as well as possibly moisten materials that may lead to mold growth. This condition, in combination with the other factors cited would inhibit rapid drying of GW.

In order for mold growth to occur, materials must be exposed to chronic moisture. Relative humidity indoors in excess of 70 percent for extended periods of time, even in the absence of other sources of water, can provide an environment for mold and fungal growth (ASHRAE, 1989). Given these factors, it is likely the GW that forms the wall cavity of the restroom interior and hallway exterior walls is the source of the odor detected in this area.

## **Conclusions/Recommendations**

Based on the observations made during the visit, the following recommendations are made:

1. Remove plastic coving from base of the employee restroom wall and examine for mold/moisture. Use the US EPA’s “Mold Remediation in Schools and Commercial Buildings” as a guideline for

removal of water-damaged GW, available at: <http://www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide>.

2. Refer to resource manuals and other related IAQ documents for further building-wide evaluations and advice on maintaining public buildings. Copies of these materials are located on the MDPH's website: <http://mass.gov/dph/iaq>.

## REFERENCES

ACGIH. 1989. Guidelines for the Assessment of Bioaerosols in the Indoor Environment. American Conference of Governmental Industrial Hygienists, Cincinnati, OH.

ASHRAE. 1989. Ventilation for Acceptable Indoor Air Quality. American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE 62-1989.

MDPH. 2015. Massachusetts Department of Public Health. “Indoor Air Quality Manual: Chapters I-III”. Available at:  
<http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/>.

US EPA. 2008. Mold Remediation in Schools and Commercial Buildings. US Environmental Protection Agency, Office of Air and Radiation, Indoor Environments Division, Washington, D.C. EPA 402-K-01-001. <http://www.epa.gov/mold/mold-remediation-schools-and-commercial-buildings-guide>.

WP. 2018. ‘It’s been relentless’: Smothering summer humidity in the Northeast has crushed records. Washington Post, Washington, DC. <https://www.washingtonpost.com/news/capital-weather-gang/wp/2018/08/30/its-been-relentless-smothering-summer-humidity-in-the-northeast-has-crushed-records/>

**Picture 1**



**Water heater inside ceiling plenum**